
II. Review of Fiscal Year 1993

The *EPA/State Management Conference Agreement* (Publication GBNEP-1, October, 1989) established a plan for the five-year effort of work leading to creation of a CCMP in 1994. This section describes work elements listed in that agreement, with discussion of progress made by the Program. Previously completed elements are only described briefly. Most emphasis is placed on two work elements of immediate and greatest concern to the Management Conference: characterization of Galveston Bay and drafting of the CCMP.

Identification and Ranking of Priority Problems

All work relating to this element has been successfully accomplished. Creation of the *Priority Problems List* was completed ahead of schedule and in accordance with the *EPA/State Management Conference Agreement* (as described in previous annual work plans). The GBNEP has successfully focused on agreed-upon goals implied by the *Priority Problems List*, often in the face of potentially strong distractions from various groups and individuals.

A conceptual model of Galveston Bay has also helped refine our understanding of the problems facing this system. The model includes the important habitats in Galveston Bay, their inter-relationships, and the effects of human uses of Galveston Bay. A multi-tiered approach encourages understanding by the public, as well as by scientists and managers. The conceptual model is based in part on the Galveston Bay Ecosystem Impact Matrix which was developed to show the relationship between valued estuarine resources and sources of perturbation of these resources. The Matrix was published in the FY 1993 Annual Work Plan.

Finally, the Management Conference has revisited the Priority Problems list in light of the many technical findings since the list was first compiled. In compiling scientific findings for the *Galveston Bay Environmental Characterization Report* a revision of the list, including more detailed descriptions of human impacts, is being undertaken to better refine initiatives of the CCMP.

Program Inventory

All work relating to this element has been successfully accomplished. As described by the *EPA/State Management Conference Agreement*, the Program Inventory had a two-fold purpose: identification of existing agency data sets related to Galveston Bay, and compilation of existing management jurisdictions and activities by governmental agencies. The GBNEP determined that these purposes were best accomplished by separate projects: a *Data Base Inventory* and a *Bay-wide Management Survey*.

The *Data Base Inventory* contains complete descriptions and specifications for existing Bay-related data sets. The inventory consists of an electronic-searchable

data base of data set descriptions, including access information. The *Coastal Preserves Regulatory Surveys* identified and described all management jurisdictions and activities within the Christmas Bay and Armand Bayou Coastal Preserves. These projects were expanded in a *Bay-wide Management Survey*, which identified and described jurisdictions on the ecosystem scale. Each of these projects has helped ensure that existing programs are not overlooked in the drafting of management initiatives for the CCMP.

Base Programs and "Action Now" Implementation

All work pertaining to this element has been completed. Analysis of base programs has entailed identification of gaps, duplications, and other shortcomings of the current management and regulatory framework.

Work under this element proceeded at two levels. For Coastal Preserves (an early action project itself), two regulatory evaluations were completed. These evaluations contributed to developing preserve management plans as well as established the scope of efforts needed Bay-wide.

Second, a Bay-wide management evaluation was completed to help guide the regulatory portion of the CCMP. Because of the fragmented jurisdictions in Texas in comparison to other states, these efforts are of critical importance in the planning process.

Overall, six project publications have been produced in the base programs analyses (Table 1).

Table 1. Publications Produced for Base Programs Analysis

| Publication | Title |
|-----------------|---|
| GBNEP-9 | Christmas Bay Regulatory Survey |
| GBNEP-10 | Armand Bayou Regulatory Survey |
| GBNEP-14 | Christmas Bay Regulatory Effectiveness Study |
| GBNEP-13 | Armand Bayou Regulatory Effectiveness Study |
| GBNEP-24 | Environmental Management Inventory of Galveston Bay |
| <i>In press</i> | Bay-Wide Management Evaluation of Galveston Bay |

Data and Information Management System (DIMS)

Work under this element has been successfully accomplished. Although a DIMS was not specifically required by federal NEP guidance, such a system was deemed necessary by the Management Conference and was therefore included in the *EPA/State Management Conference Agreement*.

Components of the DIMS Strategy were detailed in previous annual work plans. These include: creation of a *Galveston Bay Information Center*; drafting of a written and electronic *Galveston Bay Literature Survey*; creation of a written and

electronic *Data Base Inventory*; development and use of NOAA's *Coastal Ocean Management, Planning, and Assessment System* (COMPAS); utilization of the Texas Natural Resource Information Center (TNRIS) as a data archive; use of the EPA Ocean Data Evaluation System as an additional data archive; and acquisition of maps, aerial photography, and satellite imagery. Most of these initiatives are ongoing and were created to continue after the five year GBNEP planning initiative is over.

Emphasis is now shifting from management of data and information to the crafting of a DIMS strategy for long-term Galveston Bay monitoring data (see "Comprehensive Conservation and Management Plan," below). The need for improved monitoring was established when researchers encountered difficulties when attempting to utilize historical data collected by monitoring programs (see box). This DIMS initiative is now being developed for the CCMP itself, to support creation of a regional monitoring program for the agencies currently involved in monitoring. These agencies have traditionally gathered data using different methods and units of measure. Sampling sites have not been well coordinated, and data management has occurred on a piecemeal basis, with limited provision for timely distribution of management information. The regional monitoring DIMS seeks to establish agency coordination to solve these problems.

Characterization of Historical Trends, Current Status, and Human Impacts on Galveston Bay

Characterization Projects. Solving Bay problems requires fundamental understanding of the complex, dynamic ecosystem processes that shape human-induced change. The sound science necessary for management of Galveston Bay has therefore received strong emphasis in determining the work of the GBNEP and the expenditure of Program funds. The Scientific/Technical Advisory Committee of the GBNEP has overseen numerous specific projects addressing water quality, living resources, human health issues, and physical processes within the estuary. The results of these projects, along with the findings of scientists not sponsored by the GBNEP, will help ensure that comprehensive planning hits its intended mark.

Projects completed (or nearly completed) include:

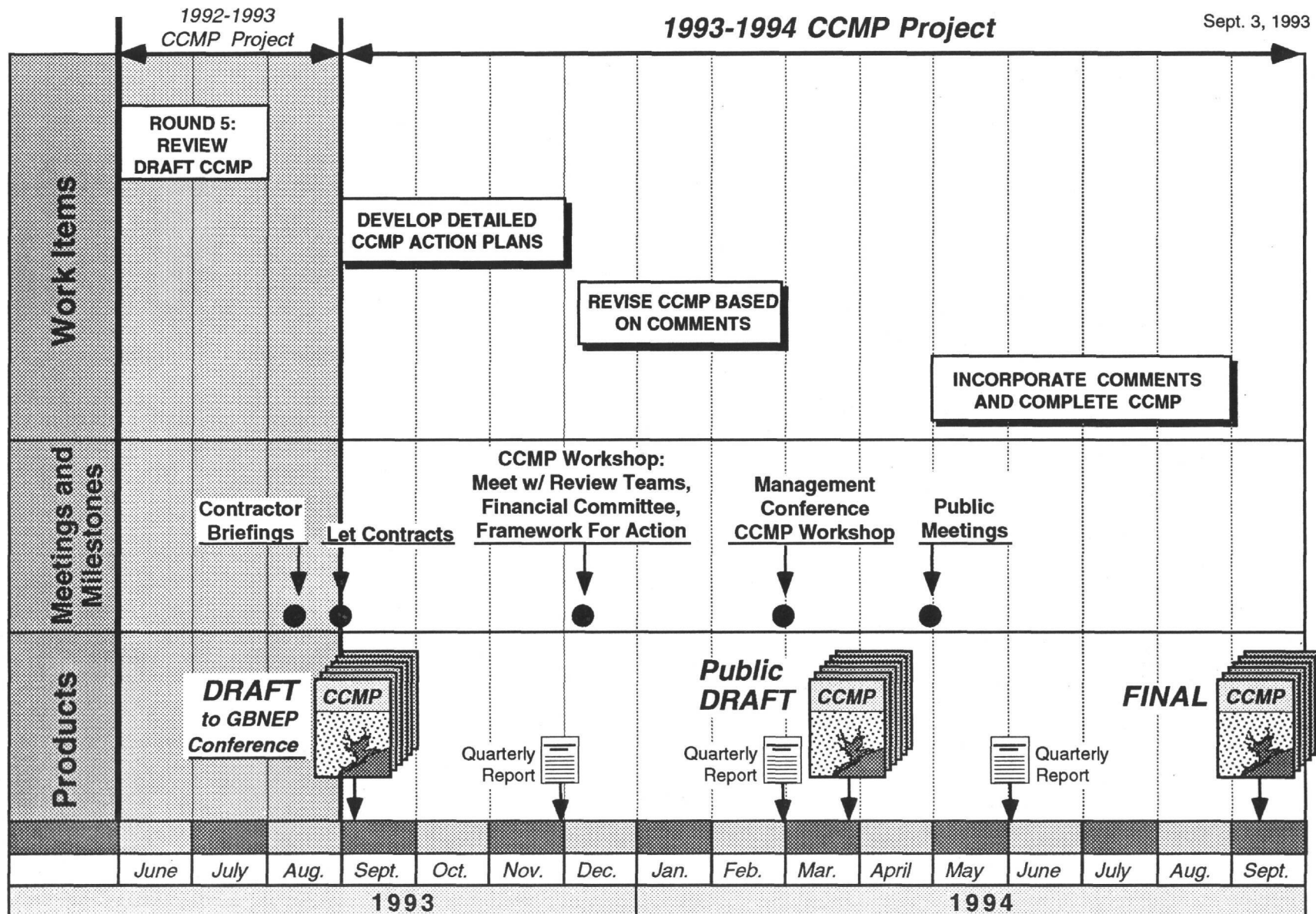
- **A Wetland Habitat Survey** to determine the extent of wetland losses in this ecosystem;
- **A Point Source Loading Study** to determine the cumulative discharge to the Bay from permitted waste water sources;
- **A Shoreline Survey for Point Source Discharges** to estimate the effects from unpermitted discharges;
- **A Non-Point Source Loading Study** to estimate the total contribution of pollutants from diffuse sources associated with storm runoff;

- **An Ambient Water/Sediment Quality Study** to determine pollutant effects on the Bay by analyzing monitoring data;
- **A Living Resources Trend Study** to discover which Bay species have decreased as a result of human activity;
- **A Bay-Wide Oyster Survey** to map this keystone estuarine species;
- **A Survey of Toxicants in Aquatic Organisms** to determine the risk associated with eating seafood commonly taken from the Bay;
- **A Public Health Synopsis** to relate shellfish closures and sources of bacteria indicative of human health risks;
- **A Survey of Toxicants in Sediments and Benthic Organisms** to determine contamination levels at several suspected toxic "hotspots;"
- **By-Catch Studies** to determine incidental losses to Bay species resulting from shrimp trawling, recreational fishing, and industrial water uses;
- **A Dredge/Fill Impacts Study** to provide an overview of dredge/fill activity from existing data in Army Corps of Engineers files from mid-1940's to present ;

Convening of the Second State of the Bay Symposium. The results of many of these and other projects were presented at the Second State of the Bay Symposium, February 4-6, 1993. The goals of this symposium were unchanged from those of the first symposium two years previous: to identify Bay projects being conducted by institutions other than the GBNEP; to promote peer interaction among the scientists involved in this research; to improve our understanding of estuarine problems in need of management solutions; and finally, to encourage project coordination in an ecosystem context.

This major gathering of more than 350 scientists, managers, and interested individuals strengthened the characterization process and helped guide initial drafts of CCMP initiatives. The results of the Symposium were also of direct benefit in the drafting of the *Galveston Bay Environmental Characterization Report* (discussed below). More than 60 participants presented research findings and contributed short written papers to a proceedings document which GBNEP published ahead of time for distribution at the Symposium. The level of participation and interest in this Symposium far exceeded staff and Management Conference expectations, resulting in standing-room-only sessions and questions too numerous to handle in the time available.

Drafting the Galveston Bay Environmental Characterization Report. The science of Galveston Bay has had immediate and vital application in crafting the factual foundation for the CCMP. The role of scientific endeavors in this process is now culminating in the drafting of the *Galveston Bay Environmental Characterization Report*. This report, to be completed September, 1993 and published shortly thereafter, will synoptically describe the estuary, with emphasis on human impacts to the Bay relating to management needs. The Environmental Characterization Report makes considerable use of maps and graphics in



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describing our collective knowledge. In substance, many of the report's findings represent new (and sometimes surprising) knowledge about the estuary, as a result of the comprehensive ecosystem approach taken during the research phase of the Program.

The greatest challenge facing the GBNEP during characterization has been to assure the Draft CCMP was based on objective findings. In many cases these findings were not yet available when management initiatives were first being drafted. Continual revision of the action plans throughout this year was necessary *prior* to completion of the Characterization Report; therefore additional early summaries of technical findings were undertaken, in the form of project fact sheets and a priority problems report.

Project Fact Sheets have been drafted by staff to report on individual project findings. Even though project reports contain executive summaries, these summaries frequently do not efficiently convey the substance of a report to a non-technical or management-oriented reader. These specially written fact sheets (some as long as five or six pages) are then used by Management Conference members during the drafting of CCMP initiatives. These fact sheets also serve as the basis for shorter summaries of project findings for public distribution as part of the published GBNEP Fact Sheet Series.

A Priority Problems Report is being developed under the guidance of the STAC. This report expands on the Priority Problems List and Ecosystem Impact Matrix drafted early in the Program, amplifying and revising these documents based on characterization findings. Based on this effort, the Priority Problems List can be fully revised to reflect a new level of knowledge about the state of the Bay.

Comprehensive Conservation and Management Plan

The CCMP is the ultimate goal of the Program, and the reason for its existence. Rapid progress has been made. Efforts have progressed toward the completion of a Draft CCMP by year-end (September, 1993). Work was a continuation of substantial efforts in FY 1992 (described in the *FY 1993 Annual Work Plan*). A guiding principal used by the Management Conference in preparing the Draft CCMP was to heavily concentrate this work in year four, leaving year five (FY 1994) for refinement, fleshing out of detail, and final review. The experience of other NEPs nationwide reinforces the need for this work load peak to be timed prior to the final year of the program.

Figure 1 summarizes elements of the CCMP effort addressed in FY 1993. All told, activities include more than one hundred meetings convened by the Program Office staff, with substantial (even prodigious) human resources devoted to information management and coordination to assure wide participation in the process. The 16 task forces organized the previous year continued to serve as the framework for CCMP development, and meet in "rounds" corresponding to phases of the development. The schedule, draft outline, and format agreed upon previously also continue to be utilized. Individual elements of the work effort depicted in the figure are discussed below.

Some Actions Being Incorporated in the Draft CCMP for Galveston Bay

- Improve the quality of Bay waters in problem areas like the Houston Ship Channel, urban bayous, and Clear Lake, by revising water quality standards to reduce pollution that results in fish kills and sediment contamination.
- Eliminate toxic oilfield discharges ("produced water"), to prevent harm to the environment, fish and wildlife.
- Search out and eliminate illegal connections to storm sewers, which result in dumped pollutants reaching Bay waters.
- Eliminate dumping of boat sewage and reduce contamination from boat maintenance activities that result in pollution in marinas.
- Reduce residential causes of pollution like waste oil, fertilizers, pesticides and other materials that wash or get dumped into storm sewers.
- Enhance oil and chemical spill damage assessment, including requiring spillers to pay for damages to Bay natural resources caused by their spills.
- Establish a seafood testing and advisory program to identify and communicate to the public the possible risks from contaminated seafood.
- Protect and restore wetlands Bay-wide by acquiring key tracts for the public trust, improving water quality standards in relation to wetlands, establishing vegetated buffers to manage polluted runoff, and providing economic incentives for habitat conservation.
- Establish beneficial uses of dredged material using a Bay-wide, coordinated plan for creation of important habitat like wetlands and bird nesting islands.
- Reduce fish and shellfish losses resulting incidentally from such activities as shrimp trawling, cooling water withdrawal, and seismic petroleum exploration.
- Assure an adequate supply of fresh water to sustain the living resources of the Bay by including estuarine inflow in water regulation and management.
- Restore and maintain natural vegetated shorelines and improve access to these shorelines by the public, to enhance habitat and reduce polluted runoff.
- Create shoreline habitat by planting and managing marsh grass for improved fish and shellfish production and to prevent shoreline erosion and damage.
- Maintain a Citizens' Pollution Reporting and Response System, including a user-friendly "hotline" to assure quick response by agencies, with follow-up to the caller for each pollution incident.

Table 2. Some Possible Improvements in Galveston Bay Management Resulting from the Comprehensive Plan

| Indicator | Currently Existing Situation | Expected Situation if No Management Plan is Adopted | With Proposed Management Plan |
|---|------------------------------|---|-----------------------------------|
| Number of Oil Field Produced Water Discharges to Bay | 62 | 62+* | 0 |
| Marinas With Sewage Pumpout Facilities for Boaters (%) | 5 % | 10 % | 100 % |
| Residential Neighborhoods with Non-Point Pollution Reduction Program (%) | 0 % | 0 - 5 % | 50 % |
| Oil/Chemical Spillers Who Pay to Compensate for Damages to Bay (%) | 1-5 % | 5-10 % | 100 % |
| Seafood Tested for Safe Consumption (Other Than Oysters) (%) | 0 % | 0 % | Routine testing/public advisories |
| Average Number of Phone Calls by Citizen to Successfully Report a Single Pollution Incident | 5-10 | 5-10 | 1 |

* However, EPA has also published its intent to issue a general permit that would have the effect of banning produced brine discharges. The GBNEP Management Committee supported this proposed action in a letter of comment on the proposal.

Round Three Task Force Meetings: Drafting an "Issues and Alternatives" document. The *State/EPA Management Conference Agreement* calls for development of management alternatives for the CCMP. This was accomplished by creation of two documents. The first was: *Managing Galveston Bay: Issues and Alternatives, Draft Discussion Items and Possible Management Strategies*. This was a detailed working document resulting from two rounds of task force meetings (32 total meetings) and substantial staff effort to identify and summarize management alternatives.

The second document was: *Managing Galveston Bay: Issues and Alternatives, Public Discussion Summary*, a public summary of the first document. This document was published and distributed specifically for public review, using guidance developed by the Policy Committee in October, 1992. The intent of the Management Conference (successfully accomplished) was to elicit maximal public involvement in pre-draft stages of the CCMP so as to strengthen the Draft CCMP itself.

Public Meetings and Review Comments. Public involvement and review of the CCMP is a key theme in both the Water Quality Act and in EPA guidance for National Estuary Programs. For the CCMP to be successfully implemented, however, the GBNEP has recognized a level of need for public involvement beyond the level required by EPA guidance. Therefore, public involvement with the CCMP was begun even prior to creation of the Draft CCMP. The *Issues and Alternatives* document described above helped in this early stage to focus public concerns. Numerous management conference members assisted in distribution by sharing the document with their colleagues and the entities they represent. The result was identification of public concerns to be included during the draft CCMP cycle, in addition to the final CCMP cycle still to come.

Table 3. Summary of Public Meeting Attendance

| Date | Location | Attendance | Speakers |
|-------------|--------------|------------|----------|
| November 9 | Houston | 86 | 11 |
| November 10 | Baytown | 58 | 9 |
| November 12 | Clear Lake | 90 | 6 |
| November 16 | Galveston | 64 | 9 |
| November 17 | Lake Jackson | 22 | 3 |
| November 19 | Anahuac | 17 | 4 |
| All | | 337 | 42 |

Between November 9 and 19, 1992, six public meetings were held in the Galveston Bay area to receive comments on Bay issues and management alternatives (Table 3). GBNEP staff and volunteers completed an active public speaking schedule in the weeks before the meetings, passing out the *Issues and Alternatives* document and answering questions. At each meeting a brief introduction to the program was provided by Program Director Dr. Frank Shipley. Then citizens were given time to speak formally to the gathering, followed by an open question and answer period with informal discussion. Both GBNEP staff and the citizens in attendance expressed the feeling that the meetings were a productive form of communication.

Table 4. Distribution of Verbal and Written Comments

| Participant Affiliation | Verbal Comments | | Written Comments | |
|-------------------------------------|-----------------|---------|------------------|---------|
| | Number | Percent | Number | Percent |
| Unaffiliated Citizens | 18 | 43 | 12 | 48 |
| Environmental/nature Groups | 13 | 31 | 6 | 24 |
| Commercial Fishermen | 5 | 12 | 1 | 4 |
| Petroleum/chemical Corporations | 3 | 7 | 1 | 4 |
| Industrial Organizations | 1 | 2 | 1 | 4 |
| Commercial Fishermen's Organization | 1 | 2 | 1 | 4 |
| Local Government Agency | 1 | 2 | 1 | 4 |
| Marina-related | | | 1 | 4 |
| Engineering/Consulting | | | 1 | 4 |

In addition to the comments presented at the meetings, written comments were submitted to the GBNEP office during an open comment period ending December 31, 1992. Spoken and written comments reflected wide-ranging support for the concept of a comprehensive management plan for Galveston Bay. An enumeration of verbal and written comments is given in Table 4.

The CCMP Workshop. Following development of initiatives by the sixteen task forces, a CCMP Workshop was convened February 25-26, 1993. The participants at the workshop included Management Committee members, Task Force Chairs, and the Framework for Action Task Force (the lead task force for CCMP implementation). The format for this meeting included intensive discussion of each developing initiative. For each initiative, a summary of technical findings was first presented by staff, followed by presentation of the initiatives by the task force chair, followed up by full open discussion by participants. This represented the first opportunity for initiatives to be reviewed as a whole by the Management Committee. Results of this workshop were extremely positive, allowing staff and the task forces to proceed with a clear focus in preparing the Draft CCMP.

**Table 5. Preliminary Ranking Criteria and Ranges
Used in Developing the Draft CCMP for Galveston Bay.**

| Category | Ranking | Range | Notes |
|---------------------|---------|---|--|
| Public Cost | Low | 1-3 people/year | Also may includes significant capital expenditure. If public capital expenditures are ranked separately, < 1 million is ranked as low, > 10 million as high. |
| | Medium | 4-7 people/year | |
| | High | > 7 people/year | |
| Private Cost | Low | Administrative or Monitoring Cost Only | |
| | Medium | Administrative or Monitoring Cost plus Minor Capital Expenditures | |
| | High | Includes Major Capital Expenditures | |
| Benefit | Low | | Benefit rankings represent relative, subjective evaluations of environmental benefit to the estuary |
| | Medium | | |
| | High | | |
| Time | Short | < 2 years | All times refer to estimated time before environmental improvements would be realized in the estuary |
| | Medium | 2 - 5 years | |
| | Long | > 5 years | |

Some Galveston Bay Monitoring Needs

Data from different collection programs should be consistent. The extreme variability of water quality in Galveston Bay is a consequence of the many and varied factors affecting the waters of the bay: pollution loads, wind, weather, inflows, waves, bathymetry, and ship and boat traffic. This variability means that a long and dense record of measurements is needed to identify relationships of use in management, and to distinguish natural variability from human impacts. Inconsistencies in measurements and analytical methods among agencies currently limit this our efforts.

Density and frequency of sampling must be scaled to the key questions. Galveston Bay is not sampled enough to answer key questions to improve management. Since salinity, temperature and dissolved oxygen are the most easily measured variables, they represent the densest and longest data record. Although daily variation is quite important, this scale of resolution is lacking and measurements are biased by their times of collection. Parameters like metals and complex organics, are measured only a few times a year.

Some important data are not available at all. For example, understanding the behavior of most nutrients, metals, pesticides and priority pollutants is limited by lack of information on suspended and bed sediment particles. Suspended solids are important in affecting water clarity (and hence habitat) and influencing pollutants which "stick" to particles. Some current data-collection programs do not even obtain measures of turbidity, and grain-size distribution data are universally lacking for suspended solids. Sediment sampling in general is currently limited to less than about one sample per five square miles per year.

Detection limits need improved emphasis. Only about ten percent of measurements for many metals and most organic pollutants were above detection limits, precluding accurate estimates of true concentrations. However, many parameters have ecological importance at levels below these detection limits, suggesting the need for methods improvement. Currently, detection limits vary and lack documentation (for example much of the metals data has been corrupted by inattention to accurate detection limits).

Once collected, data should be better managed. Studies have identified some reasons why data sets are frequently either hard to access or missing: (1) Low priority assigned to archiving due to problem-specific operation of agencies; (2) Perception of archiving "obsolete" information as an unwarranted expense; (3) Agency personnel turnover combined with inadequate data documentation; (4) Agency instability due to dissolution, merging, reorganization, displacement and relocation; (5) Natural calamities (fires, floods, hurricanes) in poorly protected housing; (6) Changes in data management technology, without upgrading of historical files; and (7) Proprietary attitude toward data by individuals. In addition, we know of significant sources of error in many major data-collecting programs, including field data entries, laboratory determinations, and digital data entry. All of these represent a loss of information that will be addressed by the Galveston Bay Regional Monitoring Data and Information Management System.

Round Four Task Force Meetings: Ranking the Initiatives. Management alternatives, once identified, must then be ranked for development in the final CCMP. Based on participation by industry groups and others, the Management Conference identified some key information necessary for ranking of activities for inclusion in the CCMP (Table 5). This information enabled task force objectives to be reviewed with respect to public cost, private cost, environmental benefit, and time to effectively implement: tools to highlight the relative merit and effectiveness of proposals. In taking this approach the GBNEP recognized that the Water Quality Act does not specify use of cost/benefit ratios for establishing initiatives; yet this kind of information needs to be "on the table" if the user groups who may be called upon to help pay for implementation are to be fairly included in the process.

Identifying Monitoring Needs. In order to track the overall condition of Galveston Bay, the impact of uses and abuses of the bay, and the effectiveness of environmental programs, a comprehensive monitoring program is needed. There is currently no coordinated, Bay-wide quality assurance and control for data collection, and historically, no single entity has had a broad enough authority to address the various kinds of ecosystem problems related to monitoring. A high degree of coordination among agencies is therefore necessary for monitoring to be successful. These challenges are further shaped by the monitoring needs for individual action plans of the CCMP being identified by five key task forces in April, 1993.

Some monitoring needs are already well known. The work of the GBNEP to characterize Galveston Bay entailed the compilation of much existing historical monitoring data. In a key project to assess status and trends for ambient water and sediment quality, Principal investigators George Ward and Neal Armstrong of the University of Texas encountered numerous pitfalls resulting from shortcomings in the existing monitoring of the Bay (see box for summary of needs they identified). The findings of Ward and Armstrong have helped guide development of future monitoring under the CCMP.

The GBNEP is drafting a Monitoring and Data Management Strategy with the following goal: "To create a unified regional monitoring program for the Galveston Bay System, including the following: 1) capability to monitor future management effectiveness and key baseline trends for management decision-making; 2) coordinated participation of agencies already conducting monitoring; and 3) adoption of standardized protocols and technology." This activity was begun in FY 1992 with the convening of the Galveston Bay Regional Monitoring Workshop, July 8-9, 1992. At the workshop agencies currently engaged in monitoring deliberated on key elements of the work. The strategy is accomplishing the following:

1. Identify Galveston Bay Management Objectives
2. Tailor Monitoring to Management Objectives
3. Establish Necessary Statistical Resolution
4. Standardize Protocols, Technology, and Quality Assurance/Control
5. Designate Institution to Oversee Program
6. Establish Agency Coordination

Potential Focus Groups for CCMP Review

Clean Water Coordinating Council
East Harris County Manufacturing Association
Houston-Galveston Area Council
Maritime Community: Pilots Association
State/Federal Regulators
Recreational Boaters
Gulf Coast Conservation Association
Boating Trade Group
Galveston Bay Foundation
Galveston Bay Conservation and Preservation Association
Audubon Society
Sierra Club
Buffalo Bayou Association
Houston Outdoor Nature Club
Citizen's Environmental Coalition
Agriculture Community (SCS?)
Association of Water Board Directors

Focus Groups: CCMP Review by Selected Organizations. Following the ranking of CCMP objectives and the further development of monitoring needs, the GBNEP is engaging in an active outreach program to involve Galveston Bay interest and user groups in CCMP development prior to its release as the draft document. These "Focus Groups" are being convened April-June, 1993 for in-depth discussion and participation by industry, environmental groups, local governments, and others. The forums created by this process and the resulting direct involvement of parties affected by the CCMP is a life or death issue for implementation, and in large part will determine the ultimate success of the CCMP in the prevailing atmosphere of industrialized greater Houston. It is hoped that this approach will make the difference between full community support of the CCMP and divided concerns that could forestall implementation. A list of groups for involvement in this process is presented in Table ().

Round Five Task Force Meetings: Final Revisions to the Draft CCMP. Preparation of the Draft CCMP will continue during Round Five of the task force meetings, mid summer, 1993. Based on ranking of initiatives, monitoring needs development, focus group participation and ongoing staff and contractor efforts, the Draft CCMP will be prepared under the guidance of the Framework for Action Task Force. The document will then be presented to the Management Committee (likely in another CCMP workshop) for further revision and forwarding to the Policy Committee for approval for public release spring, 1994. This public review will set the stage for completion the Final CCMP in Fall, 1994.

Financial Planning Committee Successfully Convened. The Financial Planning Committee (FPC) was appointed by the Policy Committee to develop recommendations for the Management Conference concerning funding for CCMP implementation. The first meeting of the FPC was January 27, 1993. At the initial meeting, the committee's role in the Management Conference was reviewed. Representatives from Apogee (contractor to GBNEP) discussed their approach and progress toward estimating costs for implementing the CCMP, and Dr. Susan Hadden (another contractor) summarized the Funding Source Inventory project, identifying possible sources of revenue for future review by the Management Conference. The Committee then discussed possible approaches to CCMP funding in anticipation of its lead role in this portion of the GBNEP. Additional meetings of the FPC are being scheduled.

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In total, these efforts continue to accomplish *Management Conference Agreement* commitments for the CCMP. With the addition of key projects planned for FY 1994 (see Part IV) this effort remains on course and on schedule.

Some Early Actions Taken by the Program to Improve Bay Management

The GBNEP has consistently sought to implement solutions to Bay management problems, even prior to completion of the CCMP. The Action Plan Demonstration Project program of the EPA has been quite helpful in providing funds for early implementation of critical actions, and other actions have been taken using other means. Below is a summary of some early actions of the GBNEP

Coastal Preserves. In 1990, a two-year project was initiated to establish Coastal Preserves for two highly valued sub-systems of Galveston Bay: Christmas Bay and Armand Bayou. This work was successful—the Preserves were created and management plans drafted as a result of this project are now being implemented. This approach to the preservation of key estuarine resources is being used as a model for creation of similar preserves throughout the Gulf of Mexico, under the Gulf of Mexico Program.

Marsh Plantings. In 1991, a project was implemented to restore fringing salt marsh habitat for living resource benefits and erosion protection. This project involves mobilization of a small army of volunteers to transplant smooth cord grass to create fringing coastal salt marsh habitat. Many of the areas planted early in the program are now firmly established, protecting the shoreline from erosion and expanding the available nursery habitat. This benefits fish and shellfish, and increases the economic value of the Bay. This project has received national recognition: Principal Investigator Bob Nailon received the top national award of the USDA, the Distinguished Service Award.

Ship Channel Pollution Prevention. In 1992, a project was initiated to reduce toxicity in the Houston Ship Channel by working cooperatively with industries having the greatest potential contributions to water quality problems. This

approach reduces pollution before it is created—by voluntary changes in process engineering and waste handling by industry. The project has benefited from close coordination with "Clean Texas 2000," a highly visible and successful program of the Texas Water Commission with outstanding industry involvement. Through this and other programs, the pollutant loading to the Ship Channel is being steadily reduced. In the early 1970s, dissolved oxygen was non-existent in this abused water body. Pollutant loading was extreme, and miles of channel were devoid of life. Today, point source reductions as a result of Clean Water Act and voluntary improvements by industry in cooperation with programs like the Pollution Prevention initiative are restoring the channel to a biologically productive element of the estuary.

Citizen's Pollution Reporting and Response System. This project was implemented in 1992 to address some long-standing problems: (1) the inability of many average citizens to report pollution, due to an elaborate mosaic of more than 20 government jurisdictions involved in pollution response; and (2) the lack of any centralized database describing pollution incidents for the Bay and its watersheds, to help focus pollution management. More than 500 calls to the 24-hour "Hotline" have resulted in improved pollution response by appropriate agencies, partially due to several new Memoranda of Understanding engendered by the project. The hotline and response activities were enthusiastically endorsed by users of the service in a response questionnaire. Future plans call for permanent implementation of the program in an appropriate agency.

Oyster Reef Creation. In 1993, work began to create new oyster reef habitat from the coal combustion by-products of nearby power plants. Coal ash (a by-product of coal-fired power generation) is pelletized and deployed in the Bay to create the hard substrate required for oyster populations to develop as a reef. Much of the preliminary experimental work necessary to determine the properties and suitability of this material for reef establishment was sponsored by Houston Lighting and Power. Tests will continue when the material is deployed in a five-acre plot. This large-scale pilot deployment (and further suitability studies) are being funded by HL&P, the Port of Houston, and EPA as a GBNEP Action Plan Demonstration Project. This work has the potential to improve the ecological and economic productivity of the Bay and establish a valuable use of an industrial by-product.

Water Quality Standards Revision. Water quality standards form the foundation for water quality management through the waste water permitting process. Far more information has been compiled by the GBNEP than has ever been used in the standards process before, and many more participating agencies and organizations are directly involved in the effort than previously. These resources provide an opportunity to make specific substantial improvements in waste load management. Therefore, the Management Conference has undertaken a Bay-wide review of current Texas Surface Water Quality Standards for Galveston Bay. This review addresses both water quality criteria and designated human uses, and will provide recommendations in 1993 to the Texas Water Commission for implementation prior to the final CCMP.

Outstanding National Resource Waters Designation for Christmas Bay. A significant element of the water quality standards revision noted above will

provide special protection to the Christmas Bay Coastal Preserve established by the GBNEP in cooperation with the Texas Parks and Wildlife Department and General Land Office. For this water body, the GBNEP is seeking designation of the first Outstanding National Resource Waters (ONRW) area in the State of Texas. This designation is being sought for Christmas Bay, deemed by the GBNEP to be worthy of permanent protection according to the highest protective standards available, inherent in the ONRW designation.

Redirection of Program Activity

As in previous years, challenges continue to result from the ambitious expectations of the program, the short time available for accomplishing these expectations, and the consensus approach required for the work of the Program to have lasting effect. Some of these challenges have been addressed with redirections of program activities.

Several of the most significant changes have required a revision of the *Galveston Bay National Estuary Program EPA/State Management Conference Agreement*. (Table 6). These revisions resulted from the fact that the original EPA/State Agreement was drafted late winter, 1989, prior to convening all committees of the GBNEP, and therefore did not reflect full conference deliberations. These changes were approved by LaJauna Wilcher, Assistant Administrator, Office of Water, in Late June, 1992, and continue to serve the purposes of the GBNEP.

Table 6. Revisions to the EPA/State Management Conference Agreement

| Program Element | EPA/State Agreement Revision |
|---|---|
| Identification and Ranking of Priority Problems | No revision. |
| Program Inventory | Coastal Preserves Regulatory Surveys and Bay-Wide Regulatory Survey due date revised from June, 1990 to August, 1992 to allow for work substantially beyond guidance that requires that only federal programs be identified. |
| Base Programs Analysis | Coastal Preserves Regulatory Evaluations and Bay-Wide Management Evaluation due date revised from July 1991 to December, 1992, to allow for work both for Coastal Preserves and bay-wide to be included. |
| Data and Information Management System | Data Information and Management System for regional monitoring system to be included in the CCMP September, 1994. This was not an EPA guidance item, but the Management Conference had recognized need for a preliminary strategy earlier in the Program. |
| Characterization Report | Characterization Report due date revised from December, 1992 to August, 1993, to account for incomplete technical projects. |
| Comprehensive Conservation and Management Plan | No revision; work toward completion of the CCMP remains on schedule. |

To date, most program redirection has involved individual program elements or projects. With some 75 projects initiated by the GBNEP to date, some readjustments are inevitable and expected. A more detailed description of the status of each project is given in Part III of this document. In spite of the many minor changes, there have been no changes that would affect the overall anticipated schedule for completion of the CCMP. The *EPA/State Agreement* and the various annual work plans have remained a generally good guide to the work being accomplished.

Reasons for redirection at the project level vary. Some redirection has resulted from improved technical knowledge previously unavailable to the Management Conference. For example, the GBNEP has contracted to map oyster reefs, anticipating that maps be available for the entire bay by a certain date. During mapping, it became apparent there were many more reefs in the bay than accepted expert opinion would have predicted. While the mapping continues, the schedule has been adjusted to account for these previously unknown conditions. Similar changes have resulted from floods and other acts of nature.

A related challenge in administering technical work has been in accommodating scientific *research* elements with an administrative and contracting system designed for *production*, or engineering-oriented projects. While engineering studies are relatively easy to schedule and anticipate work efforts, research is unpredictable by definition, making level of effort difficult or impossible to predetermine. The mixture of research and technology inherent in the NEP requires a degree of flexibility that does not always lend itself to detailed advanced planning for level of effort.

For some projects, delays have resulted from slow responses by resource agencies to provide information, Principal Investigator delays in meeting project schedules (both justified and not), and from the lengthy time required for the Management Conference review of final reports. However, project findings are frequently incorporated in the CCMP process even before they are completely reviewed, then revised as review warrants. Despite the delays, characterization still provides a factual foundation for the CCMP.

Finally, the sheer magnitude of Galveston Bay Management, both technically and politically, has required additional work not foreseen in any planning effort. As interest on the part of bay user groups, industry, and others increases, administrative changes have been made to accommodate this increased involvement. These changes are not so much in the nature of redirection as they are in simply going beyond guidance and original expectations. For example the scheduling of extra rounds of public meetings and special focus groups with industry associations and others (described above) goes beyond guidance.

These examples of program redirection have helped the GBNEP in making progress toward its goal of comprehensive management. For example, the extra time now available for completion of characterization also allows a longer public review of program findings. This in turn paves the way for acceptance of the CCMP.

